

HATCHERY EVALUATION REPORT

Ringold Springs Hatchery - Spring Chinook

September 1996

Integrated Hatchery Operations Team (IHOT)

HATCHERY EVALUATION REPORT

Ringold Springs Hatchery - Spring Chinook

An Independent Audit Based on Integrated Hatchery Operations Team (IHOT) Performance Measures

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Executive Summary

This report presents the findings of the independent audit of the Ringold Springs Hatchery - Spring Chinook program. The hatchery is located on the Columbia River , approximately 17 miles west of Mesa, Washington. The hatchery is used for adult collection, rearing, acclimation and release of spring chinook; acclimation and release of URB fall chinook; and rearing, acclimation, and release of summer steelhead.

The audit was conducted in 1996-1997 as part of a 2-year effort that will include 67 hatcheries and satellite facilities located on the Columbia and Snake River system in Idaho, Oregon, and Washington. The hatchery operating agencies include the U.S Fish and Wildlife Service, Idaho Department of Fish and Game, Oregon Department of Fish and Wildlife, and Washington Department of Fish and Wildlife.

Background

The audit is being conducted as a requirement of the Northwest Power Planning Council (NPPC) 'Strategy for Salmon' and the Columbia River Basin Fish and Wildlife Program. Under the audit, the hatcheries are evaluated against policies and related performance measures developed by the Integrated Hatchery Operations Team (IHOT). IHOT is a multi-agency group established by the NPPC to direct the development of new basinwide standards for managing and operating fish hatcheries. The Bonneville Power Administration (BPA) contracted with Montgomery Watson to act as an independent contractor for the audit.

IHOT has established five basic policies that cover: (1) hatchery coordination, (2) hatchery performance standards, (3) fish health, (4) ecological interaction, and (5) genetics. The audit focuses on all these policies, with the exception of hatchery coordination. These policies are set forth in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries (IHOT 1995)*. That document is the source for the performance measures that are the basis of this audit.

The Audit Process

The audit was based on the facility management's response to a 109-page questionnaire. This audit form was completed through a five-step process in which:

- Information was obtained from headquarters.
- The hatchery manager was asked to fill out and return the audit form.
- A 1-2 day site audit visit was conducted to inspect facilities, review hatchery records, discuss audit form responses, and develop remedial action plans.
- A compliance report was developed to document the compliance status of each performance measure. This report was then shared with the hatchery manager and IHOT representative.
- This hatchery evaluation report was written to document compliance with IHOT performance measures and develop cost estimates for remedial actions when needed.

Ringold Springs Hatchery - Spring Chinook Results

The Ringold Springs spring chinook facilities include a 9-acre earthen rearing pond and 14 vinyl raceways. Summer steelhead rearing facilities consist of a 4.8-acre earthen pond. The facility water supply consists of a gravity-flow, spring supply of approximately 27,000 gpm. The facility began operation in 1962 as part of the Columbia River Fisheries Development Program, a program to mitigate for fishery losses due to hydroelectric development in the Columbia River basin.

The Ringold Springs Hatchery - Spring Chinook program was in general compliance with most of the performance measures. In the area of program objectives, the hatchery did not meet its fry to smolt survival goal as a result of heavy losses of fish to bird predation. In the area of facility requirements, the audit found that the hatchery was not in compliance with the IHOT criteria for water quality in the areas of dissolved gases, chemistry, alkalinity and hardness, nitrite, and contaminants due to a lack of analyses for these parameters. The hatchery also did not have alarms at several recommended areas, did not follow IHOT recommendations for the frequency of monitoring alarms, and needs predator control for the large earthen rearing pond. The facility also did not meet several IHOT recommendations in the area of food storage quality control. In the area of hatchery practices, the audit found that the hatchery exceeded density criteria for rearing near the end of the rearing cycle, did not measure smoltification or have written criteria for percent smoltification, and did not follow several IHOT protocols regarding transportation. The facility also needs to develop several training protocols to be in line with IHOT recommendations. In the area of genetics policy, the audit found that the hatchery did not have a Genetics Monitoring and Evaluation Program in place.

The specific areas in which the Ringold Springs Hatchery - Spring Chinook program requires remedial actions based on the IHOT performance measures are listed below. These remedial actions are listed in alphabetical order without intent of ranking or otherwise assigning priority:

- ¥ Adopt IHOT procedures for transport vehicle disinfection
- ¥ Adopt IHOT recommendations for monitoring food production
- ¥ Conduct appropriate fishery contribution studies
- ¥ Develop a genetics M&E program in line with IHOT policies and procedures
- ¥ Develop training protocols in line with IHOT recommendations
- ¥ Document adult contribution
- ¥ Implement IHOT monitoring schedule for alarm system checks
- ¥ Install appropriate alarms on the intake and large rearing ponds, improve security at the

broodstock collection area

- ¥ Measure smoltification and develop written smoltification criteria
- ¥ Provide additional raceway rearing volume
- ¥ Provide new food storage unit for dry and moist foods
- ¥ Provide predator control on 9-acre pond to increase fry to smolt survival
- ¥ Run analysis for alkalinity and hardness
- ¥ Run analysis for chemistry parameters where no data is available
- ¥ Run analysis for contaminants
- ¥ Run analysis for dissolved nitrogen
- ¥ Run analysis for nitrite

Non-compliance issues resulting from items beyond human control or Performance Measures not relevant to this hatchery (Type 1 in Table 3, Section 4 of this report) were not listed above.

Facility Description

Name: Ringold Springs Hatchery
Stock/Species: Spring Chinook
Summer Steelhead
Fall Chinook

Operating Agency: Washington Department of Fish and Wildlife
Funding Agency: NMFS through the Columbia River Fisheries Development Program
Location: About 17 miles west of Mesa, WA on the Columbia River
Address: Ringold Springs Hatchery
1871 Ringold River Road
Mesa, WA 99343

Hatchery Manager: Mr. Art Brown
Phone: (509) 269-4448
Fax: (509) 269-4408

Purpose: Ringold Springs Hatchery serves as an adult collection, rearing, and release facility for spring chinook, rearing and release for summer steelhead, and final rearing and release for fall chinook.

Production Goal: **Spring Chinook**
Produce 1,100,000 smolts
Summer Steelhead
Produce 180,000 smolts
URB Fall Chinook

Water Supply:	Final rearing for 3,500,000
Facilities:	Springs supplying approximately 27,000 gpm

Adult Holding:	Short term holding within channel of the trap
Incubation:	N/A
Early Rearing:	N/A
Raceways:	14 8'x80' vinyl raceways (1920 cf)
Rearing Ponds:	1 9-acre earthen rearing pond
	1 4.8-acre earthen rearing pond
Satellite Facilities:	N/A

Compliance Status

The hatchery audits are based on compliance with written IHOT performance measures. These performance measures are documented in *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries* (referred to as *IHOT 1995* in this report).

The purpose of the performance measures is to implement new basinwide policies that provide regional guidelines for operating anadromous hatcheries in the Columbia Basin.

The audit focuses on performance measures for IHOT policies that cover (1) hatchery performance standards, (2) fish health, (3) ecological interaction, and (4) genetics. These performance measures are intended to guide hatchery operations once production is established. For that reason, the hatchery operations audit included broodstock collection, spawning, incubation of eggs, fish rearing and feeding, fish release, equipment maintenance and operations, and personnel training. Production priorities are beyond the scope of this audit.

Based on *IHOT 1995*, a detailed 109-page audit form was developed. The audit form divided the performance measures into six major sections along major program and technical criteria areas. Two additional sections (sections 1 and 8) include general information and expenditure information needed for this Hatchery Evaluation Report and blank forms for additional comments. The following is the basic structure of the IHOT audit form:

- | | |
|-----------|--|
| Section 1 | Performance Measures for General Information and Expenditure Information (PMs General 1-2) |
| Section 2 | Performance Measures for Program Objectives (PMs 1-4) |
| Section 3 | Performance Measures for Facility Requirements (PMs 5-15) |

Integrated Hatchery Operations Team (IHOT) 1995. *Policies and Procedures for Columbia Basin Anadromous Salmonid Hatcheries*, Bonneville Power Administration, Portland, Oregon.

Section 4	Performance Measures for Hatchery Practices (PMs 16-25)
Section 5	Performance Measures for Fish Health Policy (PMs 26-34)
Section 6	Performance Measures for Ecological Interactions (PMs 35-38)
Section 7	Performance Measures for Genetics Policy (PMs 39-43)
Section 8	Blank Forms for Additional Comments

Several performance measures are repeated in various sections of the audit form. These performance measures overlap in *IHOT 1995* and were retained to allow individuals interested in specific portions of the audit (such as Genetics or Fish Health) to determine the compliance status of all performance measures for a given topic in one location. A repeated performance measure is indicated by shaded text.

The Hatchery Audit Process

The hatchery audit will be conducted over a 2-year period that concludes in 1997. At each hatchery, a five-step process was used to complete the overall hatchery audit. This process consisted of research and onsite visits. The site visit at the Ringold Springs Hatchery was conducted on September 20, 1996..

The following is the five-step audit process:

1. Information was obtained from headquarters.
2. The hatchery manager was asked to fill out and return the **Audit Form**.
3. A 1-2 day site audit visit was conducted at each hatchery. During that visit an audit team inspected facilities, reviewed hatchery records, discussed audit form responses, and developed remedial action plans when appropriate.

4. During the site visit, the compliance status of each performance measure was discussed with the hatchery manager and IHOT representative. A portion of the Hatchery Evaluation Report was sent to the hatchery manager following the audit visit as a **Compliance Report**. That Compliance Report is Table 2 of this report.
5. This information was used to prepare a draft **Hatchery Evaluation Report**. This draft report was submitted to the operating agencies for review of the information used to determine compliance. Based on review and comments, a final Hatchery Evaluation Report was developed. The final report documents the compliance of a particular hatchery with the IHOT performance measures and presents cost estimates to correct any deficiencies.

Compliance Status of Ringold Springs Hatchery - Spring Chinook

The following table includes information on life-stages that are held on this facility for some portion of their rearing cycle (Table 1). For multi-facility programs, summary cost and contribution data is presented at the facility where rearing occurs. For the compliance status relating to performance measures that do not occur at this hatchery, please refer to the Hatchery Evaluation Reports for the hatcheries and stocks listed in Table 1. A check mark (✓) indicates that the specific life-stage is held at this facility.

This section documents the compliance status of the Ringold Springs Hatchery - Spring Chinook program. Each performance measure is presented in a table taken from the audit form (Table 2).

The compliance status is identified by the following categories:

- **N/A** (not applicable)
- **Yes** (in compliance)
- **?** (unknown; generally due to unavailability of information to determine compliance)
- **No** (not in compliance).

Remedial actions are suggested for performance measures not in compliance. These remedial actions are grouped into categories and listed in Section 4 of this report, where the cost of the required remedial actions is also presented.

Table 1 Summary Program Information for Ringold Springs Hatchery - Spring Chinook

Component	Location of Adult Holding, Spawning, Incubation, and Rearing					
	Ringold Springs Hatchery	Lyons Ferry Hatchery				
Adult Collection	4					
Adult Holding		4				
Spawning		4				
Fertilization		4				
Incubation						
green-to-eyed		4				
eyed-to-hatch		4				
Rearing						
fry	4	4				
fingerlings	4					
smolts	4					
Acclimation/release	4					

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#1	Are the hatchery programs outlined in a subbasin management plan?		4			Columbia Basin System Planning, Mid-Columbia River Subbasin 1990	
#2	Is the hatchery operating under a current hatchery operational plan? Is it understood by staff? Is it being followed?		4 4 4			IHOT Operations Plan and Operations Report-Ringold Springs Hatchery	
#3	Is a hatchery monitoring and evaluation plan in place? Do you have a written monitoring and evaluation plan?		4			Review of plan	
#4a	Adult contribution to fisheries, spawning grounds, and hatchery				4	Review of contribution data for this facility. Only BY89 data available.	Document adult contribution
#4b	Adult pre-spawning survival as compared with established goal	4				No adults held on station; occurs at Lyons Ferry	
#4c	Egg-take as compared with established hatchery goal	4				No egg take on station; occurs at Lyons Ferry	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#4d	Green-egg to eyed-egg survival as compared with established goal	4				No incubation on station; occurs at Lyons Ferry	
#4e	Eyed-egg to fry survival as compared with established goal	4				No incubation on station; occurs at Lyons Ferry	
#4f	Fry to smolt survival as compared with established goal				4	Review of records; in compliance 1 out of last 2 years	Improve predator control in 9-acre rearing pond
#4g	Production as compared with established goal		4			Review of records; in compliance 3 out of last 3 years	
#4h	Percent survival (smolt to adult) as compared with established goal			4		Data not available for recent brooders	Provide data on percent survival as it becomes available
#4i	Number of eggs, fry, fingerlings, smolts, and/or adults to meet basinwide needs	4				Review of records/Discussion. Not a compliance measure	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5a	Temperature						
	Does your water temperature meet the criteria for spawning?	4				No adults held on station	
	Does your water temperature meet the criteria for incubation?	4				No incubation on station	
	Does your water temperature meet the criteria for rearing?				4	Review of records/Discussion, spring supply is constant 58-60°F	None. Facility manages growth through feed manipulation.
#5b	Dissolved gases						
	Is the oxygen level near saturation?		4			Review of records/Discussion	
	Is the dissolved nitrogen level less than saturation?			4		No data	Run the analysis
#5c	Chemistry						
	Ammonia (un-ionized)			4		No data	Run the analysis
	Carbon Dioxide			4		No data	Run the analysis
	Chlorine			4		No data	Run the analysis
	pH		4			Review of records/Discussion	
	Copper			4		No data	Run the analysis
	Hydrogen Sulfide			4		No data	Run the analysis
	Iron		4			Review of records/Discussion	
	Zinc			4		No data	Run the analysis

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#5d	Turbidity						
	Does your turbidity meet the criteria?	4				Spring water with no visible turbidity	None
#5e	Alkalinity and hardness						
	Does your alkalinity and hardness meet the criteria?			4		No data	Run the analysis
#5f	Nitrite						
	Does your nitrite meet the criteria?			4		No data	Run the analysis

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#5g	Contaminants						
	Aldrin			4		No data	Run the analysis
	Endrin			4		No data	Run the analysis
	Dieldrin			4		No data	Run the analysis
	Heptachlor			4		No data	Run the analysis
	Chlordane			4		No data	Run the analysis
	Methoxychlor			4		No data	Run the analysis
	Lindane			4		No data	Run the analysis
	Malathion			4		No data	Run the analysis
	Guthion			4		No data	Run the analysis
#5h	Pathogens						
	What portions of the hatchery have disease-free water?						
	Adult holding	4				No adults on station	
	Incubation	4				No incubation on station	
	Early rearing		4			Inspection of facilities/ Discussion	
	Rearing		4			Inspection of facilities/ Discussion	
	Truck fill station		4			Inspection of facilities/ Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#6	Alarm Systems Do the following areas have alarms? Intake Large rearing ponds and adult holding ponds Raceway headboxes and rearing ponds Incubation facilities Quarantine areas and facilities Water treatment systems Security Are there outside systems and buzzers in on-site residences? Are water flow alarms checked daily? Are all other alarms checked weekly? Is there a log of alarms for emergencies, tests, and maintenance requirements? Are telephone pagers used?		4		4	Inspection of facilities/ Discussion Inspection of facilities/ Discussion Inspection of facilities/ Discussion None None None On-site staff conduct security checks, no automated systems Discussion Review of records/Discussion Discussion Review of records/Discussion Residences are hard-wired to alarm systems	Install appropriate alarms Install appropriate alarms Improve security at brood collection area Adopt IHOT recommendations for frequency of checking alarms Adopt IHOT recommendations for frequency of checking alarms None. Not a problem
#7	Adult collection and holding facilities						

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Do you meet the adult holding criteria?		4			Inspection of facilities, discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#8	Incubation facilities Type 1: _____ Do you have an adequate number of units for the overall program?	4				No incubation on station	
#9	Rearing facilities Type 1: Vinyl raceway Do you have an adequate number of units for the overall program? Type 2: Earthen pond Do you have an adequate number of units for the overall program?		4		4	Existing vinyl raceways are nearing end of useful life and will require replacement in near future. Need 2-4 more to meet criteria. Inspection of facilities. Water supply being upgraded	Provide additional raceway rearing volume Install bird netting
#10	Screening facilities Do you meet the approach velocity criteria? Are the fish screens regularly cleaned? Does the screen mesh meet screen opening criteria?	4				Spring water supply; screens not needed Spring water supply; screens not needed Spring water supply; screens not needed	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Are rearing containers double screened for fish that should not be released to adjacent water?	4				All fish held are released at this site	
#11	Predator control facilities						
	Are your predation control facilities effective?				4	Inspection of facilities/Discussion	Provide improved screening over raceways and new screening over pond

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#12	Food storage facilities and quality control						
	Does the storage of dry/semi-moist/moist foods (dry<12%; semi-moist 12-20%; moist >20% moisture) follow food manufacturer's recommendations?		4			Inspection of facilities/Discussion	
	Does a regional quality control officer oversee production procedures and monitor:						
	Verification by feed manufacturer that ingredients meet specifications?				4	Discussion	Adopt IHOT recommendations for monitoring food production
	Ensure feed does not contain unwanted drugs or other additives?				4	Discussion	Adopt IHOT recommendations for monitoring food production
	Analyze ingredients contained in the final food product to ensure that feed specifications have been met?				4	Discussion	Adopt IHOT recommendations for monitoring food production
	Are the foods stored and handled according to the following criteria?						

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Moist pellets should not exceed 10°F at point of delivery.		4			Discussion	
	Moist pellets should be removed from freezer just prior to feeding.		4			Discussion	
	Do not leave buckets of feed or feed containers outside exposed to light or heat.		4			Discussion	
	Open bags of feed should be fed within one to two days except when feeding small groups of fish.		4			Discussion	
	Automatic feeder hoppers and bulk storage facilities should be insulated against excessive temperatures (80°F and above).				4	Bulk storage interior can exceed 80 °F on hot days	Provide new feed storage unit on site for storage of dry and moist feed

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#13	Release facilities Do the release facilities ensure that fish are not subjected to adverse conditions?		4			Inspection of facilities/Discussion	None. However, release conditions could be improved with improvements to trap and new discharge pipe from earthen pond
#14	Pollution abatement facilities Do the pollution abatement facilities meet all federal and state regulations (or good engineering practice)? Are pollution abatement facilities operated correctly?		4 4			Inspection of facilities/Discussion Discussion	
#15	Transportation facilities Are the transport systems adequate to meet IHOT performance measures for transportation practices?		4			Inspection of facilities/Discussion. Station has no dedicated transport truck for adult transfer.	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#16	Broodstock selection practices						
	Is the donor selection process document attached?	4				Existing program; does not apply	
	Was the donor selection outline followed in selecting the hatchery broodstock?	4				Existing program; does not apply	
	Go to PM #40 in Genetics Section						
#17	Spawning practices						
	Were the appropriate number of spawners, male/female ratios, and fertilization protocols used?	4				Review of records/Discussion. Spawning occurs at Lyons Ferry Hatchery	
	Go to PM #42 in Genetics Section						
#18	Incubation practices						
	Are specific incubation standards listed in the hatchery operations plan?	4				No incubation on station	
	Are incubation practices written?	4				No incubation on station	
	Incubation Type 1: _____ (see PM #8) Do you meet the loading and flow criteria?						

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#19	Rearing practices						
	Are specific rearing standards listed in the hatchery operations plan?		4			Reviewed IHOT Operations Plan and facility plan	
	Are rearing practices written?		4			Review of facility plan	
	Rearing Unit Type 1: <u>vinyl raceways</u> (see PM #9) Do you meet the density and DI criteria?				4	Exceed density criteria last 2 months of rearing, do not use DI criteria as a standard	Provide more raceway volume to limit crowding at end of rearing period
	Do you meet the Loading and FI criteria?				4	Exceed loading criteria last 3 months of rearing, do not use FI criteria as a standard	Provide more raceway volume to limit crowding at end of rearing period
	Rearing Unit Type 2: <u>earthen pond</u> (see PM #9) Do you meet the density and DI criteria?		4			Meet density criteria, do not use DI criteria as a standard	
	Do you meet the Loading and FI criteria?			4		No loading criteria developed for this pond. New water supply will decrease loading	None
#20	Smolt quality						
	Do you produce a high quality smolt?		4			Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#21	Fish health management practices						
	Are the monthly hatchery monitoring visits being conducted? (PM #26)		4			Review of records/Discussion	
	Are the annual broodstock inspections being conducted? (PM #27)		4			Review of records/Discussion	
	Is there pathogen-free water and are the sanitation procedures being followed? (PM #28)		4			Review of records/Discussion	
	Are the following water quality parameters within criteria? (PM #5a-5h)						
	Water temperature	4			4	Review of records/Discussion	See #5a
	Dissolved gases		4		4	Review of records/Discussion	See #5b
	Chemistry		4		4	Review of records/Discussion	See #5c
	Turbidity	4				Spring water; no turbidity problems	
	Alkalinity and hardness			4		No data	Run analysis
	Nitrite			4		No data	Run analysis
	Contaminants			4		No data	Run analysis
	Are rearing standards being followed? (PM #19)				4	Exceed density and loading criteria near end of rearing	Provide more rearing volume

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Are egg and fish transfer/release requirements met? (PM #31)		4			No egg transfer on station. Release requirements are met	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#22a	Does hatchery performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas?						
#22a1	Percent smoltification Do you measure percent smoltification?				4	Discussion	Measure smoltification
	Did you meet the smoltification criteria?				4	No established index or goal for smoltification	Develop written criteria and goals for smoltification
#22a2	Rearing density (prior to release) Did you meet the rearing density criteria just prior to release?				4	Review of records/Discussion	See PM #19.
#22a3	Disease condition (at release) Did you meet all disease regulations just prior to release?		4			Review of records/Discussion	
#22a4	Number (at release) Did you meet the release number goal?		4			Review of records/Discussion	
#22a5	Size at release Did you meet the size goal?		4			Review of records/Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#22a6	Dates of release						
	Did you meet the release date goal?		4			Review of records/Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#22a7	Location of release Did you release the fish at the specified location?		4			Review of records/Discussion	
#22b	Are fish reared in the subbasin or acclimated in the subbasin? Are the fish reared in the subbasin? Are the fish acclimated in the subbasin?		4 4			Discussion Discussion	
#22c	Is the release strategy appropriate for the program?		4			Discussion. Enumeration of releases from 9-acre pond difficult, not quantitative	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23	Transportation facilities						
	Do transportation equipment and personnel receive disinfection before and after use?		4			Discussion	
	Is the fish tank interior disinfected using a solution of 200 ppm active chlorine for 30 minutes minimum or formaldehyde gas generation method (relative humidity of 60% for 2 hrs)?		4			Discussion	
	Is the exterior of the fish transport vehicle disinfected using high pressure steam (115-130°C), high temperature acid, or with 200 ppm chlorine for 30 minutes?				4	Discussion	Adopt IHOT procedures for transport vehicle disinfection
	Is the fish transport vehicle (cab) disinfected using 600 ppm quaternary ammonia compounds (1.5 ml of 50% stock solution/liter water)?				4	Discussion	Adopt IHOT procedures for transport vehicle disinfection
	Is other equipment disinfected including fish pumps, nets, egg sorters, waders, boots, rain gear, hoses and other equipment using one of the following solutions?		4			Discussion	
	200 ppm chlorine for 30 minutes		4			truck	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	600 ppm quaternary ammonia compound for 30 minutes 200 ppm iodophor solution for 10 minutes		4			everything else	
	Do personnel wear protective garments when handling fish eggs or cultural water?	4				No eggs on station	
	Do the fish transport truck/chassis and tank/unit receive an inspection and service prior to the release season?		4			Discussion	
	Is a daily service inspection completed before starting up and leaving for the day?		4			Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#23 (cont.)	Transportation facilities						
	Does the fish transport unit receive an inspection prior to loading?		4			Discussion	
	Does a pre-loading inspection covering: tank water level, pumps or aerators, oxygen injection system settings, displacement gauge, and truck loading/hauling density tables checked and reviewed occur prior to loading fish in the transport unit?		4				
	Do hauling criteria include checking the fish 45 minutes to 1 hour after loading ?		4			Discussion	
	When fish are active and systems are functioning properly, is the oxygen concentration reduced and maintained at approximately 8 ppm?		4			Discussion	
	Is water temperature in the transportation unit maintained within the 42-48 °F range?			4		Temperature measured during fill, but not during transport	Adopt IHOT procedures for transport vehicle temperature control
	Do fish releasing procedures include the following criteria?						

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Releasing the fish at the correct release site or into the correct water body.		4			Discussion	
	Tempering or the difference between the liberation tank and the target water body should not exceed 10°F.		4			Discussion	
	The liberation hose should be angled so that fish gently hit the water. Using a tripod is a method of ensuring the hose will stay at the proper angle.		4			Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#24	Evaluation practices						
	Has the hatchery conducted fishery contribution studies to:						
	Determine the requirements for evaluating and improving management programs?				4	Discussion	Conduct the appropriate fishery contribution studies
	Develop guidelines that define the geographical area and identify component stocks (hatchery and/or wild) that comprise the management unit?				4	Discussion	Conduct the appropriate fishery contribution studies
	Develop guidelines that define if the proper stocks of fish are currently being used?		4			Discussion	
	Determine which management units contribute to a specific fishery and the time periods of those contributions?		4			Discussion	
	Determine the relative contributions of the various management units to a specific fishery over the different time periods?		4			Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#25	Training practices						
	Does the hatchery have a training schedule for its staff?				4	Review of records/Discussion	Develop training protocols in line with IHOT recommendations
	Does each staff member have a personal training plan approved by a supervisor and reviewed annually?				4	Review of records/Discussion	Develop training protocols in line with IHOT recommendations
	Does the hatchery routinely exchange training details between other hatcheries and agencies?		4			Review of records/Discussion	
	Does the hatchery encourage and reward off-duty training of staff?				4	Review of records/Discussion	Develop training protocols in line with IHOT recommendations
	Does the hatchery conduct monthly staff meetings?		4			Review of records/Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#26	Are monthly hatchery monitoring visits being conducted by a qualified fish health specialist as described below?			4		Phase 2 fish health audit of WDFW not complete at this time	
	Conduct visit at least monthly			4		Phase 2 fish health audit of WDFW not complete at this time	
	Monitoring conducted by qualified fish health specialist			4		Phase 2 fish health audit of WDFW not complete at this time	
	Examine a representative sample of healthy and moribund fish from each lot.			4		Phase 2 fish health audit of WDFW not complete at this time	
	Review fish culture practices with hatchery manager.			4		Phase 2 fish health audit of WDFW not complete at this time	
	Report finding and results of necropsies on standard form.			4		Phase 2 fish health audit of WDFW not complete at this time	
	Recommend appropriate drug or chemical treatment.			4		Phase 2 fish health audit of WDFW not complete at this time	
	Summarize fish health status or stock prior to release or transfer to another facility.			4		Phase 2 fish health audit of WDFW not complete at this time	
#27	Are all of the functions of the hatchery yearly monitoring visits being completed as described below?						

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Annually examine each broodstock for the presence of reportable viral pathogens.			4		Phase 2 fish health audit of WDFW not complete at this time	
	Annually screen each salmon broodstock for the presence of <i>Renibacterium salmoninarum</i> .			4		Phase 2 fish health audit of WDFW not complete at this time	
	Conduct inspection by or under the supervision of qualified fish health specialist.			4		Phase 2 fish health audit of WDFW not complete at this time	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#28	Is the hatchery following accepted sanitation procedures?						
	Are there any sources of pathogen-free water, especially for incubation and early rearing?	4				No incubation or early rearing on station	
	Are the hatchery sanitation procedures understood and being followed as described below?						
	Disinfect/water harden eggs in iodophor?	4				No incubation on station	
	Are foot baths containing disinfectant placed at the incubation facility's entrance and exit?	4				No incubation on station	
	Is equipment and rain gear utilized in broodstock handling or spawning sanitized prior to its use elsewhere in the hatchery?		4			Discussion	
	Is equipment used to collect dead fish sanitized prior its use in another pond and/or lot of fish?		4			Inspection of facilities/ Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Is equipment, including vehicles used to transfer fish between facilities, disinfected prior to use with any other fish lots or at any other location?		4			Inspection of facilities/ Discussion	
	Are rearing vessels sanitized after fish are removed and prior to introducing a new fish lot or stock?		4			Inspection of facilities/ Discussion	
	Are dead fish properly disposed of?		4			Inspection of facilities/ Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#29	<p>Are water quality parameters being followed?</p> <p>Are the following water quality parameters within criteria? (PM #5a-5h)</p> <div> Water temperature Dissolved gases Chemistry Turbidity Alkalinity and hardness Nitrite Contaminants </div> <p>Go to PM #21</p>		4 	 4 4 4	 4	 No data No data No data	See #5a See #5b See #5c Run analysis Run analysis Run analysis
#30	<p>Are incubation and rearing standards being followed?</p> <p>Are the incubation practices following the IHOT incubation criteria? (PM #18)</p> <p>Are the rearing practices following the IHOT criteria? (PM #19)</p> <p>Go to rearing practices PM #18-PM #19</p>	4			 4	No incubation on station Density and loadings are exceeded near the end of rearing	Provide more rearing volume
#31	Are egg and fish transfer/release requirements met?		4			Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#32	Is the hatchery's program outlined in a subbasin management plan?		4			Columbia Basin System Planning Production Plan and Facility operations plan	
	Go to subbasin plan PM #1						
#33	Is the hatchery operating under a current hatchery operational plan?		4			Review IHOT Operations Plan and Facility operations plan	
	Go to operational plan PM #2						
#34	Is a hatchery monitoring and evaluation plan in place?		4			Review of plan	
	Go to hatchery monitoring and evaluation plan PM #3						

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#35	Does the hatchery program meet requirements established in the regional hatchery policies and subbasin planning documents in the following areas: species, stock, broodstock collection location, broodstock numbers, broodstock collection strategy, and spawning and egg-take protocols?						
	Does the hatchery program meet the requirements for the following?						
	Species protocols (PM #4a)		4			Review of records/Discussion	
	Stock protocols (PM #4a)		4			Review of records/Discussion	
	Broodstock collection location protocols (PM #41)		4			Review of records/Discussion	
	Broodstock numbers protocols (PM #42)		4			Review of records/Discussion	
	Broodstock collection strategy protocols (PM #41)		4			Review of records/Discussion	
	Spawning protocols (PM #42)	4				No spawning on station	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
	Egg-take protocols (PM #42)	4				No spawning on station	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#36	Does the hatchery's performance meet requirements outlined in the regional hatchery policies and in subbasin and hatchery plans for the following areas: percent smoltification, rearing density, disease condition, and the number, size date(s), and location of release?						
	Percent smoltification (PM #22a1)				4	Review of records/Discussion	Measure smoltification and develop written percent smoltification criteria Provide additional rearing volume
	Rearing density (PM #22a2)				4	Review of records/Discussion	
	Disease condition (PM #22a3)		4			Review of records/Discussion	
	Number at release (PM #22a4)		4			Review of records/Discussion	
	Size at release (PM #22a5)		4			Review of records/Discussion	
	Date of release (PM #22a6)		4			Review of records/Discussion	
	Location of release (PM #22a7)		4			Review of records/Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#37	Are fish reared in the subbasin or acclimated in the subbasin? See PM #22b		4			Fish are reared and acclimated in the subbasin	
#38	Is the release strategy appropriate for the program? See PM #22c		4			Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#39	For new programs, has a broodstock collection plan been developed?						
	Is the broodstock collection plan written?	4				Existing Program; does not apply	
	For a non-captive broodstock program:	4				Existing Program; does not apply	
	Was an unbiased, representative sample collected?						
	Was the recommended number of broodstock collected?	4				Existing Program; does not apply	
	For a captive broodstock program:						
	Were captive brood progeny excluded as donors for propagating the next generation of the captive broodstock program?	4				Existing Program; does not apply	
	Were full-sib crosses avoided?	4				Existing Program; does not apply	
	Is the broodstock collection plan understood and being followed by staff?	4				Existing Program; does not apply	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

		N/A	Yes	?	No		
#40	For a new program, was the donor selection outline followed in selecting the hatchery broodstock?						
	Is a donor selection plan written?	4				Existing Program; does not apply	
	Was the donor selection outline followed in selecting the broodstock?	4				Existing Program; does not apply	
	Was the target stock recommended in the donor selection process actually used?	4				Existing Program; does not apply	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#41	For existing programs, were the broodstock collection procedures followed?						
	Is the broodstock collection plan written?		4			Review broodstock collection plan in facility operations plan	
	Does the broodstock collection plan follow the guideline:						
	Was an unbiased, representative sample collected?		4			Discussion	
	Was the recommended number of broodstock collected?		4			Discussion	
	Were the broodstock collection procedures in hatchery operation plan understood and followed?		4			Discussion	
	Were the broodstock collection procedures in hatchery operation plan understood and followed?		4			Discussion	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#42	Was the appropriate number of spawners, male/female ratios, and fertilization protocols used?						
	Are the spawning protocols written?	4				Not at Ringold; occurs at Lyons Ferry Hatchery	
	Are daily or weekly spawning logs available?	4				Not at Ringold; occurs at Lyons Ferry Hatchery	
	Was the appropriate number of spawners used?	4				Not at Ringold; occurs at Lyons Ferry Hatchery	
	Did you attempt to spawn all collected broodstock and randomize mating with respect to age class, and other traits?	4				Not at Ringold; occurs at Lyons Ferry Hatchery	
	Was the sex-ratio within the limits given in the performance standards?	4				Not at Ringold; occurs at Lyons Ferry Hatchery	
	Were the fertilization protocols followed?	4				Not at Ringold; occurs at Lyons Ferry Hatchery	
	If the hatchery needed to reduce the number of eggs retained, was this done by representative sampling of each male/female cross?	4				Not at Ringold; occurs at Lyons Ferry Hatchery	

Table 2 Ringold Springs Hatchery - Spring Chinook Compliance With Performance Measures

PM #	Description of Performance Measure	Compliance Status				Basis for Compliance or Non-Compliance	Remedial Action Needed for Compliance
		N/A	Yes	?	No		
#43	Is there a genetics monitoring and evaluation program in place?						
	Is a genetics monitoring and evaluation program available?				4	No written program	Develop a genetics M&E program for IHOT
	Does the plan address the following elements listed in IHOT:						
	Does the program have elements needed to meet evaluation goals 1-4?				4	No written program	Develop a genetics M&E program for IHOT
	Has a qualified geneticist reviewed and endorsed the program (goal 5)?				4	No written program	Develop a genetics M&E program for IHOT
	Will the program collect the data and maintain the records needed to evaluate compliance on an ongoing basis (goal 5)?				4	No written program	Develop a genetics M&E program for IHOT
	Is the program understood and followed by staff?				4	No written program	Develop a genetics M&E program for IHOT

Remedial Actions

Based on the compliance status for each performance measure, remedial actions were developed. The required remedial actions are organized into five categories. The types of categories range across a spectrum from those actions that are beyond human control, to those that require a change in agency policy or procedures, to those that involve a significant capital cost to put in place. The following are the five types of remedial actions identified under phase 1 of the audit:

The Five Types of Remedial Actions

Type	Description
1	Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery
2	Remedial actions requiring changes in agency policies or procedures
3	Remedial actions requiring changes in monitoring coverage or interval
4	Remedial actions requiring significant capital expenditures
5	Remedial actions that may require significant capital expenditures but are not clearly definable at this time

Remedial Actions at Ringold Springs Hatchery - Spring Chinook

This section presents the corrective actions required to bring the Ringold Springs Hatchery - Spring Chinook program into compliance with IHOT performance measures. The remedial actions suggested here are just that, suggestions developed by the Montgomery Watson Audit Team. For some non-compliance areas, other remedial actions could be proposed. The required remedial actions are cross-referenced to each IHOT performance measure that was not in compliance. Where appropriate, the costs associated with the remedial actions are also presented (Table 3).

The cost estimates presented in this section are based on professional experience from similar projects. In most cases, only a lump-sum figure is presented, and detailed take-off lists have not been prepared. The cost estimates are essentially order of magnitude estimates ($\pm 40\%$).

More importantly, the suggested remedial activities may also present several levels of action. Optional actions have been listed for several problems. These optional actions are desirable for either operational or safety considerations.

**Table 3. Remedial Actions Required at Ringold Springs Hatchery - Spring
Chinook**

Remedial Action Required	Cost	PMS ¹
Type 1 - Non-compliance issues resulting from items beyond human control or Performance Measures not relevant for this hatchery		
Provide data on smolt to adult survival as it becomes available	----	4h
Water temperatures do not meet rearing criteria but no remedial action required because of manipulation of feed to manage growth	----	5a
Provide telephone pagers; however, not a problem for this hatchery because residences are hard-wired to alarm system	N/A	6
Type 2 - Remedial actions requiring changes in agency policies or procedures		
Document adult contribution	----	4a
Implement IHOT monitoring schedule for alarm system checks	----	6
Adopt IHOT recommendations for monitoring food production	----	12
Measure smoltification and develop written smoltification criteria	----	22a1, 36

Remedial Action Required	Cost	PMS ¹
Adopt IHOT procedures for transport vehicle disinfection and temperature control	----	23
Develop training protocols in line with IHOT recommendations	----	25
Develop a genetics M&E program in line with IHOT policies and procedures	----	43
Type 3 - Remedial actions requiring changes in monitoring coverage or interval		
Run analysis for dissolved nitrogen	----	5c, 21, 29
Run analysis for chemistry parameters where no data is available	----	5c, 21, 29
Run analysis for alkalinity and hardness	----	5e, 21, 29
Run analysis for nitrite	----	5f, 21, 29
Run analysis for contaminants	----	5g, 21, 29
Conduct appropriate fishery contribution studies	----	24

Remedial Action Required	Cost	PMs ²
Type 4 - Remedial actions requiring significant capital expenditures		
Provide predator control on 9-acre pond to increase fry to smolt survival	\$800,000	4f, 11
Install appropriate alarms on the intake and large rearing ponds, improve security at the broodstock collection area	\$20,000	6
Provide additional raceway rearing volume	\$205,000	9, 19, 21, 30, 36
Type 5 - Remedial actions that may require significant capital expenditures but are not clearly definable at this time		
Provide new food storage unit for dry and moist foods	N/A	12

Hatchery Contribution to Fisheries, Spawning Grounds, and Hatcheries

This section presents the audit findings for the Ringold Springs Hatchery - Spring Chinook program contribution of adult fish to fisheries, local fisheries, spawning grounds, and hatcheries. Data is reported by broodyear. A broodyear refers to the adult contribution from the eggs produced from a single group of spawning adults. For some species, this may include fish caught as 2-, 3-, 4-, 5-, and 6-year old fish. Because of the return distribution and data processing delays, the complete adult contribution for a given broodyear may not be available until 4 to 5 years after the fish have been released from the hatchery.

**Table 4. Adult Contribution to Fisheries, Spawning Grounds, and Hatcheries:
Ringold Springs Hatchery - Spring Chinook**

Year	Fisheries (Broodyear)	Spawning Grounds ¹ (Broodyear)	Hatchery ¹ (Broodyear)	Total Combined Contribution (Broodyear)	Smolt to Adult Survival (percent)
1984					
1985					

¹ Data obtained from Missing Production Groups Annual Report or from the Regional Mark Information System database.

¹¹ Total combined adult contribution; presented when it is not possible to subdivide the contribution into fisheries, spawning grounds, and hatchery contributions.

1986					
1987					
1988					
1989	123	12	41	176	0.41%
1990	no data available	no data available	1,750	no data available	no data available
1991	no data available	no data available	286	no data available	no data available
1992	no data available	no data available	524	no data available	no data available
1993	no data available	no data available	1,620	no data available	no data available
1994	no data available	no data available	524	no data available	no data available
1995	no data available	no data available	286	no data available	no data available

Annual Operating Expenditures

The level and detail of annual operating expenditures varies widely depending on hatchery, operating agency, and funding source. When provided, expenditures were presented in terms of personnel costs, operating costs (power, feed, supplies), capital costs, indirect costs charged to the federal government, third-party costs, and other costs. These cost components were summed to determine a total hatchery annual cost. Based on discussion with the hatchery manager, the percent of total hatchery costs allocated to a given program was estimated. The total hatchery costs and the percent of hatchery costs allocated to a given program were used to compute the cost of a given program. Table 5 shows the annual operating expenses for the Ringold Springs Hatchery - Spring Chinook program. For programs that occur at more than one facility (as shown on Table 1 in Section 3 of this report), the cost breakdown for the component(s) at each facility is presented in separate tables (Tables 5a and 5b).

**Table 5. Annual Operating Expenses: Ringold Springs Hatchery -
Spring Chinook**

Hatchery	1994	1995	1996
1. Ringold Springs	\$262,225	\$274,376	\$185,645
2. Lyons Ferry	data not available	data not available	data not available
3.			
4.			

5.			
Total Program Costs	data not available	data not available	data not available

The total expenditures for the Ringold Springs Hatchery are presented in Table 6 by program. The detailed breakdown of program expenditures at this hatchery is presented in separate tables (Tables 6a, 6b and 6c).

Table 6. Annual Operating Expenses - Ringold Springs Hatchery

Program	1994	1995	1996
1. Spring Chinook	\$262,225	\$274,376	\$185,645
2. Summer Steelhead	\$100,000	\$100,000	\$100,000
3. URB Fall Chinook	\$20,000	\$20,000	\$40,000
4.			
5.			
Total Hatchery Costs	\$382,225	\$394,396	\$325,645

Table 5a. Annual Operating Expenses: Ringold Springs Hatchery -

Spring Chinook

Expenditure Occurring at Ringold Springs Hatchery

Component	1994	1995	1996
Personnel Costs			
Operational Costs			

Capital Costs			
Indirect Costs			
Lumped Hatchery Costs	\$382,225	\$394,396	\$325,645
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$382,225	\$394,396	\$325,645
Source of Funds			
NMFS - 100%			
Program Production (lb)	1,278,000	1,180,000	1,025,494
Total Production (lb)	5,671,139	4,873,112	4,549,170
Program as Percent of Total	N/A	N/A	N/A
Program Costs	\$262,225	\$274,376	\$185,645

¹¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

¹¹ Percent by weight not appropriate. Program cost shown is actual for Spring Chinook.

**Table 5b. Annual Operating Expenses - Ringold Springs Hatchery -
Spring Chinook**

Expenditure Occurring at Lyons Ferry Hatchery

Component	1994	1995	1996
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs			
Lumped Third-Party Costs			
Total Hatchery Costs	data not available	data not available	data not available
Source of Funds			
Program Production (#)			
Total Production (#)			
Program as Percent of Total			

¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

Program Costs	data not available	data not available	data not available
----------------------	-------------------------------	-------------------------------	-------------------------------

Table 6a. Detailed Expenditures at Ringold Springs Hatchery by Program

Spring Chinook

Component	1993	1994	1995
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs	\$382,225	\$394,396	\$325,645
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$382,225	\$394,396	\$325,645
Source of Funds			
NMFS - 100%			
Program Production (lb)	1,278,000	1,180,000	1,025,494
Total Production (lb)	5,671,139	4,873,112	4,549,170
Program as Percent of Total	N/A	N/A	N/A
Program Costs	\$262,225	\$274,376	\$185,645

¹¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

¹¹ Percent by weight not appropriate. Program cost shown is actual for Spring Chinook.

Table 6b. Detailed Expenditures at Ringold Springs Hatchery by Program

Summer Steelhead

Component	1994	1995	1996
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs	\$382,225	\$394,396	\$325,645
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$382,225	\$394,396	\$325,645
Source of Funds			
NMFS - 100%			
Program Production (lb)	175,648	168,217	167,548
Total Production (lb)	5,671,139	4,873,112	4,549,170
Program as Percent of Total	N/A	N/A	N/A
Program Costs	\$100,000	\$100,000	\$100,000

¹¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

¹¹ Percent by weight not appropriate. Program cost shown is actual for Summer Steelhead.

Table 6c. Detailed Expenditures at Ringold Springs Hatchery by Program

Fall Chinook

Component	1994	1995	1996
Personnel Costs			
Operational Costs			
Capital Costs			
Indirect Costs			
Lumped Hatchery Costs	\$382,225	\$394,396	\$325,645
Lumped Third-Party Costs	\$0	\$0	\$0
Total Hatchery Costs	\$382,225	\$394,396	\$325,645
Source of Funds			
NMFS - 100%			
Program Production (lb)	4,217,491	3,524,895	3,356,128
Total Production (lb)	5,671,139	4,873,112	4,549,170
Program as Percent of Total	N/A	N/A	N/A
Program Costs	\$20,000	\$20,000	\$40,000

¹¹ When it was not possible to obtain a detailed cost breakdown from an agency or third party, the undivided costs were entered here.

¹¹ Percent by weight not appropriate. Program cost shown is actual for Fall Chinook.

¹1 PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.

¹1 PMs are performance measures that were extracted from the IHOT 1995 report. The IHOT performance measures are listed in Table 2 (Section 3 of this report) in numerical order.